Minutes
Technical Working Group
Conceptual Models of the Mission Space

1. The initial meeting of technical representatives of potential CMMS users was convened by DMSO on 14 August 1995 in Alexandria, VA. Lt Col Mark Jefferson, Chief, Technology Applications Division, DMSO, conducted the meeting. A list of attendees is attached.

DMSO Comments

2. DMSO regards CMMS as a first abstraction, or a description, of the real world. CMMS should be developed within a reasonable scope, rather than one which is ideal but unexecutable. Initial CMMS population will be provided by current simulation development projects. It is too expensive for DOD to "commission" construction of an abstract representation of all of DOD's operations in the absence of particular need. CMMS' initial underlying framework is proposed to utilize the UJTL (Universal Joint Task List) task hierarchy as one of its components. However, the CMMS program takes seriously the guidance from the O-6 Level Management Group to ensure CMMS' underlying flexibility to assimilate changes in doctrine and to accommodate whatever task and organization structure may exist in the future. This structural flexibility should allow the surgical removal of one model of real-world operations, its replacement with a new one, and the re-establishment of appropriate interactions between old and new tasks. Lt Col Jefferson emphasized the need for CMMS to be responsive to its users -- primarily simulation developers.

3. Lt Col Jefferson described DMSO's current effort, in which three different contractors are being asked to build experimental CMMS implementations. These experiments will help DMSO examine a "strawman" technical framework for CMMS. The first contractor is DRC, who is under contract to J-7 to look at the UJTL and JMETLs. The second is SAIC, who has done similar Naval FDB work. S3I (System Simulation Solutions, Incorporated) is the third contractor. This small company has done high-quality analytical model work and brings a solid technical perspective. Lt Col Jefferson noted that none of this work will be proprietary. The contractors will meet together and share insights. Lt Col Jefferson described the experiments as the first spiral in the CMMS development process, with the initial CMMS prototype as the second spiral, and the complete, but unpopulated, CMMS as the third spiral.

JSIMS JPO Comments

4. Miss Deborah Heystek, JSIMS, started by briefing the JSIMS Mission Space Model (JMSM). JSIMS is building an object model of the JSIMS problem space using object-oriented analysis methods. (As stated in the JSIMS MOA.) The problem space includes operations of a joint task force commander and his battlestaff. The JMSM user would access a repository of classes and objects. Also available in the repository will be the code that goes with the object classes. Users who build simulations within the JSIMS architecture could then do analysis with the object classes and reuse the accompanying code during design. JMSM will have Executive Agents for land, air, sea, and possibly the environment, for coordination across the services and to pass down information to the service component groups. Miss Heystek also noted that

processes cut across phases of war and echelons of command and it makes sense to reason about them. The accepted procedure during JTF ATD research was to start with doctrine, model it to the extent possible, then talk to experts, possibly using a team approach. Researchers found process discussions were easy for subject matter experts to understand. In discussion, there was general agreement that when the military prepares to simulate its operations it needs to think in terms of process. Miss Heystek also expressed confidence that JMSM can provide a value-added mapping, whatever the scheme, between scenario-based object classes (available in 1996) and either process models or a CMMS-like interaction model. Lt Col Jefferson, noting that JMSM appeared to be closely tied to simulation (perhaps simulation-dependent), suggested further discussion of the relationships between JMSM and CMMS would be needed to both understand the JMSM approach and create a distinct interface.

JWARS Comments

5. LTC Prosser, JWARS Deputy Director, briefed the current status of JWARS. It takes the same fundamental approach as JSIMS, while it is not as far along in planning and structure. It will be involved in an HLA proto-federation next year at this time. While JSIMS' concern is training, JWARS is initially concerned with the analytic world, bringing M&S to bear to help in decision-making. In decision-making for operations or force allocation in war planning, the joint staff and PA&E are using an aggregate-level approach rather than entity-based. Therefore, they hope to decompose only to brigade level since battalion-level modeling would involve much greater complexity. It was suggested that fidelity might be useful in determining the level of aggregation/dis-aggregation required. LTC Prosser noted a particular emphasis in JWARS on C3 and ISR (Intelligence, Surveillance and Reconnaissance) and joint functions, areas not covered adequately by current models. JWARS intends to build a prototype for demonstration in June, 1996. Lt Col Prosser noted that JWARS object modelers will look at functions as well as objects. They are thinking about domain (behavior or process) modeling and how it might feed the object model business. The group suggested that even with object-oriented analysis, it is impossible to determine the methods (actions & interactions) needed unless one understands the functional processes and tasks. As JWARS development proceeds, however, the high-level design itself will evolve to pure object form. In another prototype strategy, JWARS hopes to take a single joint mission, say strike operations, and drill down in much more detail for that single mission than for the others.

ARPA - STOW 97 Comments

6. LCDR Peggy Feldmann, ARPA, discussed the status of synthetic forces for STOW 97. LCDR Feldmann noted the serious challenge posed for knowledge acquisition in the simulation of command and control procedures. The knowledge acquisition/knowledge engineering (KA/KE) process is key to STOW. While STOW 97 requirements are generated by USACOM training audiences, the four services are also treated as primary customers. LCDR Feldmann would use domain analysis to describe combat operations, joint command entities, missions, etc., for many of these processes are similar and lend themselves to reuse. The existence of a single technical framework, however, is very important to derive the benefits of process commonality. LCDR Feldmann also suggested that future efforts could benefit from the English language system

descriptions and task descriptions generated in STOW knowledge acquisition, even though they are not reduced to data.

J-7 Comments

7. Lt Col Anzalone, JCS J-7, briefly discussed the UJTL (Universal Joint Task List) as a flexible new means to define a joint framework. The ad hoc assembly of forces deploying today demands that DOD be as flexible as possible in modeling them. The tasks are English language descriptions with the consensus of 140 agencies. They are joint tasks defined independent of means. The program's next challenge is to link tasks to joint doctrine. JWFC will have the lead in this effort, promoting communication, especially with the operators. Lt Col Anzalone also explained operation templates and discussed task conditions, such as political constraints and assumptions.

Discussion

8. Lt Col Jefferson suggested collaborative efforts between programs to use each other's information, supported by these meetings. This is important since STOW has started a prototype mission space and JSIMS and JWARS are getting started nearly together. In the future, utilization of a CMMS populated by today's simulation development programs will enhance interoperability. Future efforts will be able to realize the fruits of today's combined knowledge acquisition as a common point of departure, as well as starting with a ready-made abstract model of operations as a basis for detailed analysis. It is not the intention of DMSO to coerce major simulation development programs to use a particular tool to capture information to populate a CMMS technical framework; it would not be appropriate to impact those programs. The logical approach appears to be development of interface or translation tools that allow information appropriate to the CMMS to be "lifted" from current analysis or KA efforts.

9. A majority of attendees expressed agreement that, although there are different viewpoints, the concept is feasible in principle and very useful. They stipulated that there should be a basic underlying information structure of which the *task-organization-interaction* view is only one of many possible views.

Issues - The following should be dealt with extensively during forthcoming deliberations.

1. Flexibility of Underlying Scheme -- Will a concept of operation based on a standard task scheme (UJTL), which is founded in today's doctrine, survive into the future? Or, will it be necessary to build the framework again?

2. Name -- Conceptual Models gives the impression of Lanchestrian engagement simulation algorithms, "piston" methods and the like. Many modelers use the term "conceptual models" in the context of a highly detailed real-world model. Perhaps difficulty with understanding the concept is introduced by the name.

3. "Bottom-up" or "Top-down" taxonomy building -- It is suggested that initially declaring a "taxonomy" of mission spaces and asking modelers to model to that taxonomy is arbitrary and counterproductive. Others believe some "framework" is useful as a starting point.

4. "View" of the technical framework -- Define all CMMS terms and differentiate between underlying structure and external views of the underlying data in all discussions of framework.

5. KA/KE using SME groups rather than strictly by doctrine -- Is it possible to start from doctrine, ascertain whether it is truly applied using a trackable SME group, and derive authoritative, manageable real-world processes?

6. Content filtered for importance -- Are we over simulating? Can we filter what is focused on in KA based on whether it is important to the customer? Is an abstract model of operations sufficient to allow a developer to choose entities and interactions to be simulated? One opposing opinion is that all information must be available in a database, important interactions and entities as well as all details, before the ultimate customer can decide what is needed in a particular simulation.

Attachment - Attendees

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